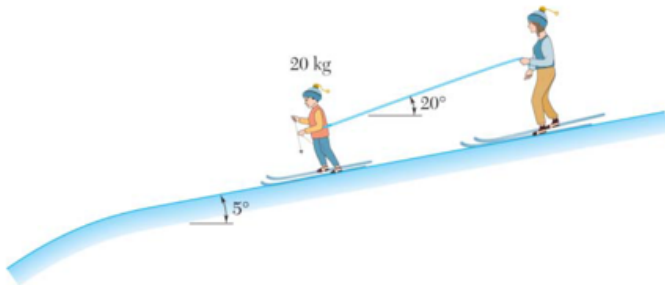


# HW #3 – Chapter 12



## PROBLEM 12.10

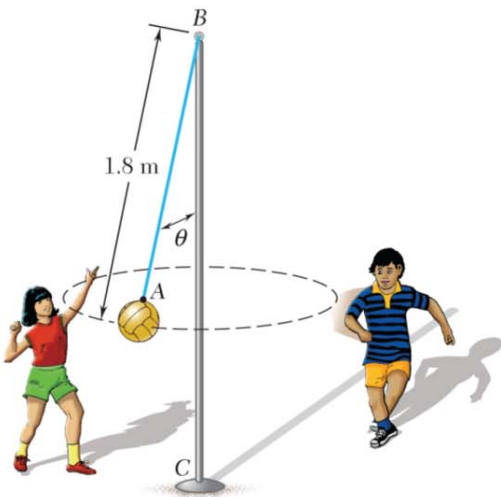
A mother and her child are skiing together, and the mother is holding the end of a rope tied to the child's waist. They are moving at a speed of 7.2 km/h on a gently sloping portion of the ski slope when the mother observes that they are approaching a steep descent. She pulls on the rope with an average force of 7 N. Knowing the coefficient of friction between the child and the ground is 0.1 and the angle of the rope does not change, determine (a) the time required for the child's speed to be cut in half, (b) the distance traveled in this time.

## PROBLEM 12.22



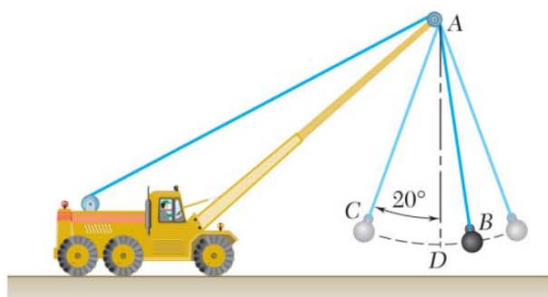
To unload a bound stack of plywood from a truck, the driver first tilts the bed of the truck and then accelerates from rest. Knowing that the coefficients of friction between the bottom sheet of plywood and the bed are  $\mu_s = 0.40$  and  $\mu_k = 0.30$ , determine (a) the smallest acceleration of the truck which will cause the stack of plywood to slide, (b) the acceleration of the truck which causes corner *A* of the stack to reach the end of the bed in 0.9 s.

## PROBLEM 12.36



A 450-g tetherball *A* is moving along a horizontal circular path at a constant speed of 4 m/s. Determine (a) the angle  $\theta$  that the cord forms with pole *BC*, (b) the tension in the cord.

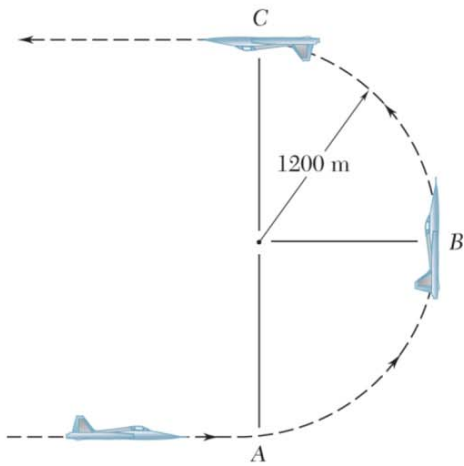
## PROBLEM 12.44



A 130-lb wrecking ball *B* is attached to a 45-ft-long steel cable *AB* and swings in the vertical arc shown. Determine the tension in the cable (a) at the top *C* of the swing, (b) at the bottom *D* of the swing, where the speed of *B* is 13.2 ft/s.

### PROBLEM 12.50

A 54-kg pilot flies a jet trainer in a half vertical loop of 1200-m radius so that the speed of the trainer decreases at a constant rate. Knowing that the pilot's apparent weights at Points  $A$  and  $C$  are 1680 N and 350 N, respectively, determine the force exerted on her by the seat of the trainer when the trainer is at Point  $B$ .



### PROBLEM 12.127

The parasailing system shown uses a winch to pull the rider in towards the boat, which is travelling with a constant velocity. During the interval when  $\theta$  is between  $20^\circ$  and  $40^\circ$ , (where  $t = 0$  at  $\theta = 20^\circ$ ) the angle increases at the constant rate of  $2^\circ/\text{s}$ . During this time, the length of the rope is defined by the relationship  $r = 125 - \frac{1}{3}t^{3/2}$ , where  $r$  and  $t$  are expressed in meters and seconds, respectively. At the instant when the rope makes a 30 degree angle with the water, the tension in the rope is 18 kN. At this instant, what is the magnitude and direction of the force of the parasail on the 75 kg parasailor?

